

In life, this scale is usually found between the pine needles just at the point where they emerge from the sheath. Occasionally specimens are found within the fascicular binding or out on the needles not over an inch away. They are usually on the needles which are one and two years old.

There is no doubt whatever about the last three stages for the adult female has been found within the apodous form, the latter having the cast skin of the preceding stage covering the posterior part of the body. A smaller cast skin, presumably of this individual, was beneath. There is a decided difference in the size of these two cast skins which also would indicate that there are two larval stages preceding the apodous form.

EXPLANATION OF PLATES.

Plate 13.

Matsucoccus fasciculensis, n. sp.

- A. Several individuals situated in a fascicle of pine needles. (Enlarged.)
- B. Spiracles and alternate button-like processes of first stage larva, side and top view. (Very much enlarged.)
- C. Leg of first stage larva. (Very much enlarged.)
- D. Antenna of first stage larva. (Very much enlarged.)
- E. First stage larva, ventral view. (Greatly enlarged.)
- F. Cast skin of first stage larva, ventral view. (Much enlarged.)

Drawn by F. B. HERBERT.

Plate 14.

Matsucoccus fasciculensis, n. sp.

- A. Apodus form or third stage larva, ventral view. (Much enlarged.)
- B. Spiracle of apodous form, top and side view. (Very much enlarged.)
- C. Antenna of adult female. (Very much enlarged.)
- D. Leg of adult female. (Very much enlarged.)
- E. Duct of adult female, which, viewed from above, has the appearance of an 8-shaped pore. (Very much enlarged.)
- F. Large simple pores of adult female. (Very much enlarged.)
- G. Spiracle and tracheae of adult female. (Very much enlarged.)
- H. Adult female, ventral view. (Much enlarged.)

Drawn by F. B. HERBERT.

DESCRIPTIONS OF SEVEN NEW SPECIES OF OPIUS (HYMENOPTERA-BRACONIDAE).

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This paper contains descriptions of seven new species belonging to the genus *Opius*. Types of five of the new species are from

continental North America while types of the other two species are from Trinidad, British West Indies. In order to indicate relationship and facilitate identification, the place at which each species runs out in the writer's previously published key to the North American species of the genus *Opius* (Proc. U. S. Nat. Mus., vol. 49, 1915, pp. 68-72) is given at the beginning of each description.

Opius cupidus, new species.

In the writer's key to species of *Opius* (l. c.) this species runs to category 24 and agrees best with the first alternate of that couplet. It is at once distinguished from *provancheri* Dalla Torre, however, by the fact that the recurrent nervure is interstitial with first intercubitus instead of joining the second cubital cell; and also by the fact that the thorax, with the exception of the mesosternum and propodeum, is reddish testaceous like the head. Resembles *canaliculatus* Gahan, but differs in that the median impression on the mesoscutum is not nearly so elongate, the propodeum lacks the transverse carina near base, and the first tergite is different.

Female.—Length 3 mm. Head viewed from above more than twice as broad as long; ocellular line more than three times the length of the greatest diameter of an ocellus; vertex and frons polished; face polished, moderately hairy, with weak setigerous punctures and a distinct median ridge; malar space about equal to the width of mandible at base; clypeus with sparse, irregular punctures and separated from the mandibles by a narrow transverse opening; eyes ovate, moderate in size, and broader than the posterior orbits; antennae inserted opposite the middle of the eyes, 34-jointed in the type, the first two flagellar joints subequal and approximately two and one-half times as long as thick, following joints shorter but all distinctly longer than broad. Thorax polished, very sparsely hairy, the mesoscutum and scutellum mostly bare above, the former with a few pale hairs on the anterior portion and a very few posteriorly on each side of the short, elliptical median depression; parapsidal grooves foveolate and deeply impressed at the anterior lateral angles of the mesoscutum, entirely effaced on the posterior two-thirds of the mesoscutum; transverse groove separating the scutellum from mesoscutum broad, deep, and strongly crenulate; mesopleura with a broad and strongly crenulate longitudinal depression below the middle; propodeum irregularly rugoso-punctate, with an incomplete and poorly defined median longitudinal carina basally; wings with the stigma broad; first radial abscissa about equal to one-half the width of stigma, second abscissa approximately one and one-fourth times the length of the first intercubitus; radial cell rather broad and terminating some distance before extreme wing-apex; recurrent nervure exactly interstitial; first brachial cell closed

at apex; second cubital cell slightly narrowed toward apex. Abdomen about as long as thorax, broadly elliptical; first tergite bicarinate basally, depressed between the carinae, the apical half broadly elevated and aciculate-punctate medially, the lateral margins smooth; tergites beyond the first smooth and polished; ovipositor concealed from above, retracted within the large cavity formed by the last dorsal and last ventral segments. Spot enclosed by ocelli, eyes, antennae entirely, prothorax beneath, mesosternum and lower part of mesopleura, metathorax, propodeum, first tergite, and ovipositor sheaths, black; palpi, all tarsi, and more or less of the abdomen beneath blackish; wings faintly fuscous on basal half, subhyaline on apical half, the veins and stigma blackish; remainder of the insect reddish testaceous.

Type locality.—New York City, New York.

Type.—Cat. No. 22373, U. S. Nat. Mus.

Type and one female paratype labelled "Collected on beet; New York, N. Y.; July 11, 1916; H. B. Shaw, collector; Chittenden Number 4972⁹¹." Also one female paratype labelled "Parasite, on *Pegomyia hyoscyami* Panzer; Brooklyn, N. Y.; August 9, 1918; Montague Free, collector."

Opius turneri, new species.

In the writer's previously mentioned key to species of *Opius* (l. c.) this species runs to category 50 where it agrees with the first character of the second alternate but not with the second character of that alternate, the propodeum being broadly polished medially. Besides the differently sculptured propodeum it differs from *oscinidis* Ashmead by having the mesopleural impression not crenulate, the first tergite granularly sculptured instead of irregularly striate, and the cavity between mandibles and clypeus more distinct. From *americanus* Gahan it differs in addition to the differently sculptured propodeum, by lacking the tooth on ventral margin of mandible, by the distinct cavity between clypeus and mandibles, and by the much more weakly sculptured first and second tergites. Resembles *bruneipes* Gahan but is at once distinguished by the sculptured first and second tergites and the partially sculptured propodeum.

Female.—Length 1.25 mm. Head viewed from above more than twice as broad as long; ocellocular line more than twice the diameter of an ocellus; head polished, impunctate, the face very sparsely hairy, without punctures and without a distinct median ridge; malar space a little shorter than the basal width of mandible; cavity between clypeus and mandibles transverse-linear but distinct; eyes ovate, moderately large, about twice as wide as the posterior orbits; antennae inserted above the middle of eyes, 22-jointed in type, the first flagellar joint fully three times as long as thick, following joints gradually decreasing in length but none less than twice as long as thick.

Thorax polished, nearly glabrous; mesoscutum without a median dimple posteriorly, and without parapsidal grooves except at the extreme anterior lateral angles where they are barely indicated; transverse groove separating mesoscutum and scutellum foveolate; mesopleural impression weak and smooth; propodeum polished medially, distinctly though finely sculptured laterally; forewing with the stigma long and narrow; first radial abscissa very short, not much longer than thick, second abscissa nearly twice the first intercubitus, third abscissa distinctly longer than the first and second combined and attaining the wing margin considerably before the extreme wing-apex; recurrent vein nearly interstitial; second cubital cell narrowing apically; first brachial cell closed at apex. Abdomen as long as the thorax; first tergite granularly opaque and without carinae; coalesced second and third tergites without a distinct separating suture, weakly sculptured on the basal half, with two short oblique furrows diverging from middle of the anterior margin, posterior half and all of the following tergites smooth; tip of ovipositor barely visible from above. Black; scape, mandibles, palpi, legs including all coxae, first tergite and greater part of the coalesced second and third tergites pale reddish testaceous; abdomen except as noted blackish brown; tarsal claws black, hind tibiae and tarsi slightly fuscous; wings hyaline, veins and stigma dark brownish.

Male.—Similar in every way to the female, the allotype antennae 23-jointed.

Type locality.—Greenwood, Mississippi.

Type.—Cat. No. 22734, U. S. Nat. Mus.

Three females and one male reared from dipterous leaf-miner on cowpeas, July 31, 1916, by C. F. Turner and recorded under Greenwood No. 385. The species is named for the collector.

Opius downesi, new species.

This species runs in the writer's classification of the Opiinae (l. c.) to category 48 of the key to females of the genus *Opius* but does not agree with either alternate on account of the ovipositor which is exerted distinctly more than half the length of abdomen. It also differs from all of the species included under category 48 of the key by the fact that the mesoscutum has a deep, nearly circular median impression posteriorly in front of the scutellum.

Female.—Length 3 mm. Head viewed from above more than twice as broad as long; ocellular line about three times the diameter of the lateral ocellus; vertex and frons polished; face polished, sparsely hairy, with very faint setigerous punctures and a distinct median longitudinal ridge; malar space slightly shorter than the width of mandible at base; mandibles fitting close to clypeus, without an opening between; eyes moderately large, ovate; antennae inserted above the middle of face, 36-jointed in the type. Thorax

polished and moderately hairy; mesoscutum with a distinct deep dimple-like impression posteriorly, the parapsidal grooves distinctly impressed at the lateral anterior angles of mesoscutum but mostly effaced on the dorsum; mesopleura smooth, without a distinct impression below the middle; propodeum rugoso-punctate, opaque, without longitudinal carinae; stigma of forewing long and narrow; radial cell long, terminating slightly before the extreme wing-apex; first abscissa of radius distinctly longer than the width of stigma opposite, second abscissa approximately one and one-half times as long as the first intercubitus; second cubital cell long, not narrowed at apex; recurrent nervure joining the second cubital cell, the abscissa of cubitus between first intercubitus and recurrent vein nearly as long as the nervulus, first brachial cell closed at apex; abdomen about as long as the thorax; ovate, first tergite about as long as broad at apex, distinctly though rather irregularly longitudinally striate, and bicarinate basally; coalesced second and third tergites with the suturiform articulation distinct though not deeply impressed; second tergite throughout and basal one-third of third tergite strongly longitudinally striate, the striae terminating abruptly; apical two-thirds of the third tergite and all of the following tergites polished; ovipositor protruding beyond the apex of abdomen approximately four-fifths the length of abdomen. General color blackish; head, antennal flagellum, dorsum of thorax, propodeum, and ovipositor sheaths black; the posterior middle of mesoscutum and region surrounding scutellum more or less piceous; first tergite for the most part, lateral margins of second and third tergites, apex of third and the following tergites entirely, piceous or blackish; scape, pedicel, more or less of clypeus, mandibles except at apex, pronotum, pleura for the most part, legs including all coxae, and the abdomen except as noted, fusco-testaceous to reddish testaceous; hind tibiae and apical joint of all tarsi fuscous; wings hyaline, venation blackish with the base of the veins paler. Male unknown.

Type locality.—Victoria, British Columbia.

Type.—Cat. No. 22372, U. S. Nat. Mus.

Host.—*Rhagoletis pomonella* Walsh.

Described from four female specimens reared by Mr. W. Downes, of the Canadian Department of Agriculture, from pupae of the above-named host. A single paratype deposited in the national collection of the Dominion of Canada at Ottawa, Canada. Holotype and two paratypes in the U. S. Nat. Mus. Named in honor of the collector.

Opius richmondi, new species.

Runs to category 22 in the writer's key (l. c.) and agrees fairly well with the first alternate. The infuscation on the wing is very faint, however, while the ovipositor is exerted slightly more than the full length of the abdomen. This species is still further

distinguished from *fuscipennis* Gahan by the fact that the vertex is not so strongly arched above the top of eyes, the eyes are larger, the flagellar joints are all distinctly longer than broad, the ocelli are much larger, and the propodeum is more rugosely sculptured. It may be separated from all of the species falling under category 21 of the key by the much longer ovipositor.

Female.—Length 2.5 mm. Head viewed from above more than twice as broad as long; ocelli rather large; ocellular line about two and one-half times the diameter of an ocellus; vertex and frons polished and rather more than ordinarily hairy, the hairs pale yellowish; face moderately hairy, shining, with conspicuous setigerous punctures, and a broad, low, median ridge; malar space approximately equal to width of mandible; cavity between clypeus and mandibles rather broad and transverse; eyes moderately large, ovate; antennae inserted a little above the middle of eyes, 34-jointed; first flagellar joint about two and one-half times as long as broad; following joints gradually decreasing in length and thickness, those near the apex one and one-half to two times as long as broad; thorax polished, with rather conspicuous pubescence; mesoscutum with a slit-like depression posteriorly, extending from the middle to near the posterior margin; parapsidal grooves deeply impressed anteriorly for about one-third the length of mesoscutum, entirely effaced beyond; transverse suture separating mesoscutum and scutellum with about five carinae, the median one more conspicuous than the others; mesopleura smooth with the impression below the middle distinctly crenulate; propodeum coarsely rugose with a distinct, irregular, transverse carina before the middle; stigma of forewing moderately broad, subtriangular; radial cell long, terminating slightly before the extreme wing-apex; first abscissa of radius slightly shorter than the width of stigma; second abscissa approximately one and one-third times the length of first intercubitus; third abscissa much longer than the first and second combined; recurrent vein joining the second cubital cell; second cubital cell narrowed apically; first brachial cell closed at apex; abdomen about as long as thorax, elliptical; first tergite strongly bicarinate on the basal half, more weakly so on the apical half, the space between carinae on the apical half elevated and weakly rugulose; laterad of carinae practically smooth; tergites beyond the first smooth and polished, sparsely hairy; ovipositor exerted the length of the abdomen, measured from the base apparently nearly as long as head and thorax combined. Color uniformly dark reddish testaceous; eyes and ovipositor sheaths black; antennae brownish black, the base of scape paler; wings faintly fuscous on basal half, the apical half hyaline, stigma and veins dark brown.

Male.—Essentially like the female but with the vertex, occiput, and thorax very dark reddish, almost piceous.

Type locality.—Cherryfield, Maine.

Type.—Cat. No. 22375, U. S. Nat. Mus.

Described from three females and one male received from Mr. E. Avery Richmond, and said to have been swept on the blueberry "Barrens" at Cherryfield, Maine, by Mr. W. Colcord Woods, August 26, 1915.

This species occurs coincidentally with *Opius melleus* Gahan (= *Boisteres rhagoletis* Richmond, as already pointed out by the writer in Proc. U. S. Nat. Mus., vol. 55, 1919, p. 123) and may have the same host, viz., *Rhagoletis pomonella* Walsh. Specimens of *melleus* are in my possession swept by Mr. Woods on the same date and apparently at the same place as the types of *richmondi*. In his account of the blueberry insects of Maine (Maine Agric. Exp. Sta. Bull. 244, 1915, p. 263) Mr. Woods makes mention of having swept *Opius melleus* on August 26, 1915, but does not mention the occurrence of another species. Since *melleus* and *richmondi* are superficially quite similar it is possible that Mr. Woods' observations and remarks may have been based in part on *richmondi*.

While superficially alike the two species are quite distinct and easily separated by the fact that in *melleus* the second abscissa of cubitus is no longer than first intercubitus, the parapsidal grooves are complete, the second tergite is distinctly striated, and the ovipositor is exerted the length of the body.

Opius lectus, new species.

This species, like *richmondi*(ante), runs to category 22 in the writer's key (l. c.) and is very similar to both *fuscipennis* and *richmondi*. It differs from *fuscipennis* by having the eyes and ocelli larger, vertex less strongly arched above the top of eyes, posterior orbits less than one-half the width of eye, basal half of wing very faintly infuscated, propodeum a little more rugosely sculptured, and the head and thorax in part black. It may be distinguished from *richmondi* by the following description.

Female.—Length 3 mm. Setigerous punctures of the face distinct though small; malar space shorter than width of mandible at base; antennae 33-jointed in the type; flagellar joints thicker than in *richmondi*, those in middle of flagellum barely longer than broad; stigma broad; first radial abscissa about half as long as the width of stigma; second abscissa very slightly more than one and one-third times the length of first intercubitus; ovipositor exerted about one-third the length of abdomen, measured from base probably not as long as the abdomen. Antennal flagellum, eyes, frons and vertex except a broad orbital line, occiput medially, prothorax for the most part, mesopleura, metathorax, propodeum, more or less of first tergite, ovipositor sheaths and tarsal claws black; abdomen beyond the third tergite tinged with brownish, remainder of body and legs dark reddish testaceous;

wings faintly infuscated on basal half, hyaline apically, venation blackish. Otherwise agrees with the description of *richmondi*.

Male.—Like female except that the black on frons is confined to a large rounded spot embracing the anterior ocellus and confluent above with the black on vertex; the propodeum is largely concolorous with mesoscutum and lacks a definite transverse carina, while the spiracles of first tergite are more prominent than in the female.

Type locality.—Cherryfield, Maine.

Type.—Cat. No. 22378, U. S. Nat. Mus.

Two females and one male received from E. Avery Richmond, who states that they were swept by Mr. W. Colcord Woods, August 26, 1915, on the blueberry "barrens" at Cherryfield, Maine.

The types of this species were apparently collected at the same time and under the same conditions as those of *Opius richmondi*. The remarks appended to the description of the latter species would therefore apply equally to this one and the species may be parasitic on *Rhagoletis pomonella* Walsh.

Opius trinidadensis, new species.

This species is at once distinguished by its large size and lack of sculpture from the blackish species included by Brues and Richardson in their key to known species of *Opius* inhabiting South and Central America (Bull. Amer. Mus. Nat. Hist., vol. 32, 1913, p. 502). In the writer's key (l. c.) it runs to *crawfordi* Viereck, and is very closely related to that species but may be distinguished by slight differences in the clypeus as well as by the color of the mesoscutum.

Female.—Length 5.5 mm.; length of ovipositor 6 mm. Head viewed from above fully twice as broad as long; ocellocular line approximately two and one-half times the diameter of an ocellus; ocellar triangle distinctly elevated and bounded laterally by shallow grooves; posterior orbits equal to about half the eye-width; frons and vertex polished with very few hairs; vertex nearly straight, not arched above the top of eyes; face rather thickly hairy, shining, with distinct setigerous punctures, and a strong median, longitudinal ridge extending from the antennal fossae to the middle of clypeus; anterior margin of clypeus very slightly angulated at the middle and at each lateral angle; these angulations similar to those in *crawfordi* but less prominent; malar space slightly longer than width of mandible at base; cavity between the clypeus and mandibles transverse, about half as broad as the median length of clypeus; antennae inserted far above the middle of eyes, longer than body, 54-jointed, the flagellar joints all longer than broad; thorax polished; mesoscutum with distinct, complete, non-foveolate,

parasidal grooves and broadly depressed posteriorly but without a median dimple-like impression before scutellum; transverse suture between mesoscutum and scutellum crossed by only one carina; mesopleura smooth, without a distinct impression below the middle; propodeum polished and glabrous above, more or less weakly sculptured and thickly hairy on the posterior half; propodeal spiracles at the anterior end of a distinct shallow depression; abdomen about as long as head and thorax combined, smooth and polished throughout; first tergite strongly bicarinate from base to near apex and distinctly longer than broad; stigma of forewing broad; radial cell terminating some distance before the extreme wing-apex; first radial abscissa equal to about half the width of stigma; second abscissa twice as long as first and a little shorter than the first intercubitus; recurrent vein interstitial; second cubital cell narrowed towards apex; first brachial cell closed. Antennae, head except mouth, mesoscutum, tegulae, legs for the most part, ovipositor sheaths, and the venation, black or blackish; clypeus, mandibles except apex, front coxae, median coxae on inner side, fore and median tarsi except apical joint, pale testaceous; wings uniformly dark fuscous; remainder of thorax and the abdomen very dark reddish testaceous.

Male.—Length 5 mm. In other respects agrees with the description of female.

Type locality.—Trinidad, British West Indies.

Type.—Cat. No 22376, U. S. Nat. Mus.

Hosts.—*Anastrepha striata* Schiner and *A. serpentina* Wiedemann.

Described from five females and four males reared in June and July by F. W. Urich, from the two above-named Trypetids.

This species may be only a geographic race of *crawfordi* Viereck.

Opius cereus, new species.

Runs in the writer's key (l. c.) to category 6 where it disagrees with the first alternate by having the second tergite not striated and it will not agree with the second alternate, since the wings are hyaline. In Brues and Richardson's key (l. c.) it runs to *areolatus* Szepligetti and differs from the description of that species mainly in slight color characters.

Male.—Length 4 mm. Head viewed from above transverse, fully twice as broad as long; frons and vertex polished, rather more than ordinarily hairy, the former with distinct, though small, setigerous punctures; vertex nearly straight, and only slightly elevated above the top of eyes; ocellular line about three times the diameter of an ocellus; face shining, distinctly hairy, with distinct setigerous punctures and a low broad median ridge; malar space distinctly longer than the width of mandible at base; anterior margin of clypeus sinuate, slightly angulated at the middle and at each lateral angle, separated from the mandibles by a narrow transverse cavity;

eyes moderately large, ovate; posterior orbits equal to half the width of eye; antennae inserted slightly above the middle of eyes, 48-jointed in the type, the flagellar joints all distinctly much longer than thick; thorax polished, sparsely hairy; mesoscutum with the parapsidal grooves complete, deep, broad, and non-foveolate; transverse groove separating the mesoscutum from scutellum deep, with one longitudinal carina in the middle; mesopleura smooth, the impression below the middle non-foveolate; propodeum thickly covered with pale yellowish hairs, rugulose-punctate, with a short strong median carina anteriorly and distinctly areolated on the posterior face; the areolation comprised mainly of an elongate pentagonal median area extending from a little before the middle to the posterior margin and on either side of this a broader, deeply depressed, irregularly shaped area which is limited outwardly by a strong curved carina that runs from the posterior nearly to the anterior margin; propodeal spiracles on low tubercles, stigma of forewing rather long and moderately broad; radial cell long, terminating considerably before the extreme wing-apex; first abscissa of radius about equal to the breadth of stigma; second abscissa one and one-half times the first abscissa and slightly shorter than the first intercubitus; third radial abscissa fully twice as long as the first and second combined, nearly straight; recurrent nerve interstitial; second cubital cell narrowed toward apex; first brachial cell completely closed; posterior wing with a very distinct postnervellus; abdomen about as long as thorax; first tergite smooth, strongly bicarinate on the basal half, the carinae fading out slightly behind the middle; tergites beyond the first entirely smooth and polished; coalesced second and third tergites showing no trace of the suturiform articulation. General color pale reddish testaceous; antennae, apex of mandibles, eyes, ocellar triangle, tegulae, hind tibiae except a broad median band, their tarsi, and the apex of abdomen above, black or blackish; wings hyaline, with veins and stigma black.

Type locality.—Trinidad, British West Indies.

Type.—Cat. No 22377, U. S. Nat. Mus.

Host.—*Anastrepha* species.

Described from three males reared in June, 1917, by F. W. Ulrich.

SCAPHINOTUS (PSEUDONOMARETUS) MANNII N. SP. (COLEOPTERA CARABIDAE).

By H. F. WICKHAM.

Elongate, not very convex, minutely pubescent, elytral disk distinctly flattened, sutural region impressed. Black, faintly tinged with brown, scarcely shining, minutely alutaceous, beneath piceous. Head very long, the genae slightly more prominent than the eyes which are small and circular, only a little protruding, emargination of labrum very deep, apices of the processes